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DESCRIPTION OF PREPARATORY STAGES OF ARGYNNIS CYBELE, FABR.

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EGG—Conoidal, truncated, broad at base, the sides moderately rounded; depressed at summit; marked by about eighteen prominent, vertical, slightly wavy ribs, half of which extend from base to summit and form around the latter a serrated rim; the remainder end irregularly at two thirds to three quarters distance from base; between each pair of ribs are equidistant transverse striæ. Broader at base than *Alcestis* or *Idalia*. Duration of this stage 12 to 17 days.

YOUNG LARVA—Length .07 inch; cylindrical, thickest at 5 and 6; color dull green, translucent; each segment from 3 to 12 marked by a transverse row of eight subtriangular tubercular dark spots, of which six lie on dorsum and upper part of side and one on each side below spiracles; the middle spot of the upper three is back of the line and near the posterior edge of the segment; from each spot spring one or two long curved hairs; on 13 is a dorsal row of four spots and a second of two spots near the extremity of the segment; on 2 is a chitinous oblong dorsal patch on which are minute tubercles, four in front row and one behind the first and fourth of that row, each with fine hairs; head a little broader than any segment, rounded, slightly bilobed, a little pilose; color black-brown.

After 1st Moulting—Length .13 inch; cylindrical, stoutest in middle; color dull green mottled with brown, the latter taking the form of interrupted longitudinal stripes; spines disposed as in *Alcestis* and other members of the group; tapering, black, rising from black tubercles, except those of the lower lateral row, which have dull yellow tubercles; each spine ending in a short black bristle, and beset with several others; feet black, pro-legs greenish-brown; head sub-cordate, the vertices rounded, the front flattened and covered with many long black hairs; color shining black-brown. To next moult 8 to 12 days.

After 2nd Moulting—Length .24 inch, color chocolate-brown, the lower lateral spines pale yellow at base and for one third up; both other rows have the bases more indistinctly yellow and then mostly on the outer sides, the inner being nearly or quite black; spines otherwise shining black, the bristles black; head subcordate, flattened frontally, the vertices rounded, and at top of each on front side a little conical black process; minute processes or tubercles are scattered over the face, the hairs springing from them; color shining black. To next moult 4, 6 and 9 days, according to the state of the weather.

After 3rd Moulting—Length .4 inch; color dark velvety-brown; the spines black; all of the lower laterals yellow at base and for about one third up; the upper laterals distinctly yellow at base on the anterior segments, the yellow gradually fading to the last segments; the dorsals also distinctly yellow on anterior segments, the last wholly black; the dorsal spines on 2 are directed forward, but are no longer than others; head as at next previous stage, black in front, but yellow behind; all yellow is reddish, or honey colored.

At this stage there was some variation in individuals in the color of the spines. One had all distinctly yellow at base except the dorsals on 2 and 12, which were black. To next moult 5 to 8 days.

After 4th Moulting—Length .6 inch; color velvet-black; lower laterals wholly bright yolk-yellow; upper laterals same on anterior half, the remainder duller yellow; dorsals bright yellow on anterior half, but after 6 less so, and on 9 to 12 black; on 2 dorsals wholly black; in line with the dorsal spines on segments from 3 to 11 two gray dots; head as before.

Another larva had all three rows of spines largely reddish-yellow, fully half way up from base; the last two pairs of dorsals shading into brown. To 5th moult 4 to 8 days.

After 5th Moulting—Length 1.1 and 1.2 inch. Reached maturity in six to eight days.

MATURE LARVA—Length 1.8 inch at rest, 2 inches in motion; greatest breadth at rest .35 inch; color velvety-black, under side chocolate-brown; between each pair of dorsal spines from 3 to 11 two gray dots transverse; the spines throughout slender, beset with short black bristles; the bases of all spines reddish-yellow, and for about two thirds up, the rest

shining black; the spines of 2 wholly black, a little recurved, directed forward, but no longer than other dorsals; the longest dorsals 14-100 inch; feet and pro-legs black; head small, .14 inch wide, and equally high, subcordate, the front flattened, finely tuberculated, the back much rounded, the vertices sub-conic, and each on its anterior side giving a small black conic process; the face much covered with black hairs of irregular length; color of front dull dark brown, of back reddish-yellow. Several larvæ were as described, others showed much less yellow on the spines; the lower laterals always largely yellow, the upper laterals much less so, the dorsals a little yellow at base from 3 to 6, after that less and less, changing gradually to brown, and on 11 to 13 black. In from 2 to 3 days after maturity the larvæ suspended, and in about 24 hours pupated.

CHRYSLIS—Length 1.1 inch; breadth at wing cases .4, of abdomen .36 inch; cylindrical, a little compressed laterally; head case prominent, nearly square at top, the vertices being but very slightly elevated, transversely rounded to the ridge at summit, the sides bevelled; mesonotum moderately prominent, rounded, carinated; followed by a deep rounded depression; the wing cases with prominent conical processes at base, much elevated above surface of body, the outer edges flaring, the middle part depressed; on the abdomen two rows of small tubercles corresponding to the dorsal spines of the larva, and which extend to the head case; one row of minute tubercles on each side; the whole surface finely corrugated; color variable, being sometimes glossy dark brown, with a fine mottling of reddish-orange, not distinct, over wing cases and anterior parts; or dark brown mottled with drab, this last prevailing on the wing cases; or dark brown mottled with lighter brown, most distinctly light at margins of wing cases, where they pass down to surface; or almost wholly dead-leaf brown, a little obscure on wing cases; the anterior abdominal tubercles usually black in front, yellow behind, the posterior tubercles wholly black. Duration of this stage 16 to 20 days.

In CAN. ENT., vi, p. 121, 1874, I gave a general account of breeding the larvæ of *Cybele*, *Aphrodite* and *Diana*. Since that date I have bred *Cybele* as well as other species of this group, but before 1880 I always lost the larger part of the larvæ during the winter, or they died off at their successive stages, or in chrysalis. I attempted to keep the larvæ after hatching, which occurs in September or October, in a cool room free from

dampness, they being placed on stems of violets growing in pots. But the alternation of warm with cold weather during the fall and winter was unsuitable for the larvae, the leaves damped off, or the plants died, and there was a constant loss. After the survivors were brought into a warm room later in the winter they were not healthy, but lingered along, every stage being protracted, many perishing even up to chrysalis and imago, or the butterflies perhaps came out crippled. In 1873, starting with more than 300 young larvae of *Diana*, I obtained but a single butterfly. From as many eggs of *Cybele* I got three butterflies, and of *Aphrodite* one chrysalis only, which died before imago.

Encouraged by the results obtained by freezing the larvae of *Satyrus Alope* in winter of 1878-79, I determined to try the effect of cold on the larvae of *Cybele*, and availing myself of the kindly offered aid of Prof. C. H. Fernald, I sent a considerable number of recently hatched larvae to him at Orono, Maine, to be placed in ice-house. They were in small paper pill boxes, the unglazed sides of which afforded foothold. I had found that the eggs or larvae of *Alope* escaped mould in such boxes, while others on cloth were destroyed. These little boxes were placed in a flat tin box, which was deposited in the sawdust beneath the ice, "frozen sawdust," as Prof. Fernald wrote. Five months later, on 5th March, 1880, I received the boxes by mail. The larvae were found to be nearly all alive—not more than one or two dead—and when first seen several showed some movement, though only three days from ice. Others were lethargic some hours longer, but by the 6th nearly all had left the boxes and betaken themselves to the plants of violet amid which I had laid them. They crawled at and down the stems, and disposed themselves in the concave sides just as they do in the fall when about to go into lethargy. On 10th March one of the larvae was found to have passed 1st moult, several days in advance of any other, and it continued in advance to maturity, passing 2nd moult 18th, 3rd 27th, 4th 4th April, 5th 12th April, suspended 23rd, pupated 24th, and gave imago, *Cybele* ♀, 14th May. The whole period from ice to butterfly was 73 days. The other larvae passed 1st moult 19th March, 2nd 29th March to 2nd April, 3rd 4th to 6th April, 4th 11th to 12th, 5th 16th to 19th April, and the butterflies issued 12th to 27th May.

What loss of larvae there was occurred before 1st moult, partly by escape, as it seemed, but partly, as I thought, from having been introduced to a warm room too abruptly. But after the moult I lost none. I

preserved some examples at every stage in alcohol, and so reduced the number, but there was no death among the larvae which were allowed to proceed, and I obtained at last seven perfect butterflies, 1 ♂, 6 ♀. They were also of very large size, equal to any taken in the field. It is evident, therefore, that freezing did not injure the larvae, but on the contrary, invigorated them, enabling them to pass their successive stages rapidly.

Comparing the length of these stages with larvae bred in 1873-4.

Iced larvae, 1880.

Time from removal to 1st moult.....	8 to 18 days.
“ 1st to 2nd “	8 to 12 “
“ 2nd to 3rd “	4 to 9 “
“ 3rd to 4th “	5 to 8 “
“ 4th to 5th “	4 to 8 “
“ 5th to chrysalis.....	9 to 12 “
“ chrysalis to butterfly.....	16 to 20 “

Total period.....54 to 87 “

Larvae kept in cool room, as related.

Time from removal to 1st moult	44 days and upwards.
“ “ 1st to 2nd “	17 “ “
“ “ 2nd to 3rd “	11 “ “
“ “ 3rd to 4th “	12 “ “
“ “ 4th to 5th “	14 “ “
“ to chrysalis.....	12 “
“ in “	24 “

From removal from cool room to imago.134 “ and upwards.

From 1st moult to imago, 90 days.

I have no doubt that by freezing any species of larvae which hibernate, they may successfully be carried to imago—such as *Argynnis*, *Melitæa*, *Colias*, *Apatura*, *Satyrids*, *Hesperians*, etc. Probably it would be better not to remove them from the ice until spring has fairly set in, instead of rousing them prematurely, as I did in case of *Cybele*.

Comparing the coloration of the butterflies from the iced larvae with examples taken this season in the field, I see no difference.

MONTREAL BRANCH OF THE ENTOMOLOGICAL SOCIETY
OF ONTARIO.

SEVENTH ANNUAL REPORT OF THE COUNCIL.

At the close of the seventh year of the Society's existence your Council beg to present their Annual Report. The retrospect of the year in Entomological matters is a pleasant one. Nine meetings have been held, the attendance at which has been good, and the intercourse of the members has been both agreeable and instructive. Besides the eight papers whose titles are hereafter given, many valuable observations on insect life have been recorded in our minutes, which will be of great assistance to us in the future.

Your Council would also notice that during the summer of last year several enjoyable collecting excursions were participated in by the members, resulting in the discovery of several species of insects hitherto unknown in this locality. On the whole, it is with great pleasure that your Council report the Society to be satisfactorily progressing in the study of our science.

The papers read during the year are as follows:

1. "A Description of the Male *Alypia MacCullochii* Kirby," by William Couper.
2. "Notes on a Species of *Cossus* taken at Montreal," by F. B. Caulfield.
3. "The Milk Plant, its Insect Parasites, red and black in color," by William Couper.
4. "How to Preserve Specimens of Insects," by G. J. Bowles.
5. "On Luminous Insects," by Geo. H. Bowles.
6. "Montreal Hymenoptera," by Wm. Couper.
7. "Notes on Rearing Lepidoptera," by H. H. Lyman.
8. "Some of the Insects that Frequent the Orchard and Garden," Rev. F. W. Fyles. (Selected) by G. J. Bowles.

The study of the Hymenoptera of Montreal has been taken up by Mr. Couper, whose capacity and experience render it certain that the task will be well performed, and result in a great increase in our knowledge of that interesting order. Your Council would recommend the members to follow his example, and during the coming season give special attention

to other divisions which hitherto we have almost neglected, namely, the Diptera, Orthoptera, Hemiptera and Neuroptera.

The following works have been added to the Society's Library during the year :

"Monograph of the Diptera of North America." Part 3, 4 plates.

By H. Loew.

"New Species of N. A. Coleoptera." Part 1. By J. L. LeConte.

"The Coleoptera of Kansas and Eastern New Mexico," 2 plates. J. L. LeConte.

"Synopsis of the Melolonthidæ of the United States" J. L. LeConte.

"Catalogue of Coleoptera adjacent to the Boundary Line between the United States and Mexico," 1 plate. J. L. LeConte.

"Revision of the Buprestidae of the United States," 1 plate. J. L. LeConte.

"Report of the Entomological Society of Ontario for 1879."

"Report of the Fruit Growers' Association of Montreal, 1879."

The following were presented by the Royal University of Christiania :

"On the Mollusca of the Arctic Regions." One large volume and two pamphlets.

"A List of Norwegian Lepidoptera taken in 1876."

The Secretary and Treasurer's cash statement is submitted herewith, and shows the finances to be in a satisfactory condition.

In conclusion, your Council would express the hope that the members will not relax their efforts during the present season, and that the result of the summer's campaign will be even more favorable than that of last year.

The whole respectfully submitted.

GEO. JNO. BOWLES, President.

GEO. H. BOWLES, Secretary.

Montreal, 17th May, 1880.

CORRECTION.—On page 113—last Satyrus paper—is an error. Three lines from bottom, let the two lines beginning "Indeed the only," etc., be stricken out. It turns out that North Bend is in the extreme northwest of Indiana, and not on the Ohio, as I had supposed; and the statement I make is inapplicable in the connection.—W. H. EDWARDS, Coalburgh, W. Va.

ENTOMOLOGY FOR BEGINNERS.

BY R. VASHON ROGERS, JR., KINGSTON, ONT.

CLYTUS.

Among the Coleopterous hosts there is a family called Long-horns, or Capricorns, in vulgar parlance ; or Cerambycidae, when we are talking learnedly. They derive these names from the fact that they possess very long antennae (sometimes longer than their bodies), which are generally re-curved like the horns of a wild goat (the Latin *Caper*). They form a very large family ; already 4,000 of them are known and recognized by the scientific world. They comprise some of the largest, most showy, as well as most destructive, of the Beetles ; one of African origin—*Prionus Hayesii* by name—is five inches long and one broad, with antennae of seven inches and legs of four. The Long-horns are world-wide, and their abundance is in proportion to the richness of vegetation of different countries, so that South America, India, Ceylon and the Moluccas contain a great number of the most beautiful and the largest Capricorns.

They have earned the name of Borers because they are, in fact, "animated gimlets," and spend their lives while in the larval state in perforating and feeding upon trees ; some live and carry on their operations in the trunks, others in the branches ; some devour the wood, others the pith ; some are found only in shrubs, some in the stems of herbaceous plants, others confine their attentions to the roots. Some are to be found only on one species of plants, others have a wider range. Some bore straight holes, others branch off at divers angles, others make tracks as various as those of an engraver, while some are regular screws. The Germans, lovers of music, as they are, call these beetles "Fiddlers," because they give forth, especially when annoyed or taken in the hand, a squeaking or rasping noise produced by rubbing the joints of the thorax and abdomen together. Some of the family are not only musical-boxes, but scent-bottles as well, and emit a fragrant odor not unlike that of otto of roses.

The members of this family, as a rule, are very handsome, and readily attract notice by their elegant forms and resplendent attire, that is, when of full age ; when young—in the creeping age—they are ugly in the extreme. Harris tells us that the various members of the family resemble

each other in the following respects : The antennæ are long and tapering. The body is oblong, approaching to a cylindrical form, a little flattened above, and tapering somewhat behind. The head is short and armed with powerful jaws. The thorax is either square, barrel-shaped, or narrowed before, and is not so wide behind as the wing-covers. The legs are long ; the thighs thickened in the middle ; the feet four-jointed, not formed for rapid motion, but for standing securely, being broad and cushioned beneath, with the third joint deeply notched. Most of these beetles remain upon the trees and shrubs during the day time, but fly abroad at night. Some of them, however, fly by day, and may be found on flowers, feeding on the pollen and blossoms.

The pride of our Canadian forests, the Maple tree, suffers much from the attacks of *Clytus speciosus* (fig. 21), the largest of our native members of the family. This beautiful beetle is easily recognized ; it is about an inch in length, and the third of one in breadth. The head is yellow, with antennæ and eyes of reddish black. In shape the body is somewhat cylindrical, a little flattened above and tapering behind. The thorax is black with two yellow transverse spots on each side. The wing covers for more than half their length are black, for the rest they are yellow ; they are gaily ornamented with bands and spots arranged as follows : A yellow spot on each shoulder, a broad yellow curved band or arch, of which the yellow scutel forms the keystone, on the base of the wing covers ; behind this a zig-zag yellow band forming the letter W ; across the middle another yellow band arching backwards, and on the yellow tip a curved band and a spot of a black color ; the legs are yellow.

The under side of the abdomen is reddish yellow, variegated with brown. The female has the advantage of her mate in size, but her antennæ are somewhat shorter. She possesses a pointed tube at the end of the abdomen, through which the eggs are passed from her body into the cracks and crevices of the bark. The tube can be contracted or extended at the will of the fair owner and to suit the emergency of the case.

The parent lays her eggs on the bark of the Maple in July or August. As soon as the grubs are hatched they burrow into the bark, and there find protection during the cold of winter. When the warm days again



Fig. 21.

return the larvæ begin again their labors, penetrating deeper and deeper into the heart of the tree, sometimes tunnelling as much as three inches into the solid wood ; they make long and winding galleries up and down the trunks. A carpenter is known by his chips, so their presence is readily detected by the little heaps of sawdust that they throw out of their work-shops. If in time a stiff wire is inserted into their holes they can be easily put an end to by impaling. They are long, whitish, fleshy, deeply marked by transverse cuts ; their legs, although sixteen in number, are merely rudimentary promises of legs, and for ornament, not use ; they are of no avail for the purpose of locomotion. Not by means of their eight pairs of legs, but by alternately contracting and extending the segments of their bodies, do these worm-like creatures force their way along, and in order to assist their progress each segment is furnished with fleshy tubercles capable of protrusion, and which being pressed against the sides of their retreats, enable them to thrust forward by degrees the other segments (Ent. Rep., 1872, p. 36).

The head is the box of tools with which they saw and cut their way through the wood ; their work "is done slowly but effectively, and their gnawing teeth, though slow in action, are as resistless as the mordant tooth of time."

About midsummer these busy little carpenters who have never seen the light of day, unless by accident, strike—not for higher wages—but for a higher stage of existence ; they labor no more, but in the innermost recesses of their living homes fold themselves up snugly for their pupa sleep. At first the nymph is soft and whitish, but gradually it hardens and darkens till at last it lies enwrapped in a filmy veil, beneath which all the external parts of the future beetle are visible. The wings and the legs are folded calmly on the breast, while the long antennæ are turned back against the sides of the body and then tucked up between the legs. When at length it has become matured, it breaks its slumbers, forces its way through the bark, and comes out of its dark and narrow retreat to see the world and enjoy for the first time the glorious light of day and the pleasures of legs and wings, and love and passion, and to propagate its race.

Clytus pictus Drury, or the Painted Clytus, is another of our common species. Its form is very similar to that of *C. speciosus*, and it varies from six-tenths to three-fourths of an inch in length. Harris thus describes it : It is velvet black, and ornamented with transverse yellow bands, of which

there are three on the head, four on the thorax, and six on the wing-covers, the tips of which are also edged with yellow. The first and second bands on each wing-cover are nearly straight; the third band forms a V, or united with the opposite one, a W, as in *speciosus*; the fourth is also angled, and runs upwards on the inner margin of the wing-cover towards the scutel; the fifth is broken or interrupted by a longitudinal elevated line, and the sixth is arched and consists of three little spots. The antennæ are dark brown, and the legs are rust-red.

Clytus Robinia Forster.—According to Walsh the male of this species differs from *C. pictus* in having much longer and stouter antennæ, and in having its body tapered behind to a blunt point, while the female is not distinguishable at all. This insect does great injury to the Locust and Acacia trees, and appears in the perfect state in September. Harris confounds this with *Clytus pictus*; in fact, it was long considered by Entomologists to be identical with it. It has sometimes been known as *Clytus flexuosus* Fab.

During comparatively late years *Robinia* has been extending its sphere of operations. For a long time it was known only in New York. Some thirty years ago it appeared in Chicago, and in 1863 it was seen two hundred miles further west. In 1855 it was first observed in Montreal; in 1862 it was very destructive to the Locust trees around Toronto; in 1873 Mr. E. B. Reed saw it in enormous numbers in London, Ont. Now it seems to be quite at home in all parts of Ontario. Harris, speaking evidently of this, though under the name of *C. pictus*, says: "In the month of September these beetles gather on the Locust trees, where they may be seen glittering in the sunbeams with their gorgeous livery of black velvet and gold, coursing up and down the trunks in pursuit of their mates, or to drive away their rivals, and stopping every now and then to salute those they meet with a rapid bowing of the shoulders, accompanied by a creaking sound, indicative of recognition or defiance. Having paired, the female, attended by her partner, creeps over the bark, searching the crevices with her antennæ, and dropping therein her snow-white eggs, in clusters of seven or eight together, till her whole stock is safely stored. The eggs are soon hatched, and the grubs immediately burrow into the bark, devouring the soft inner substance that suffices for their nourishment until the approach of winter, during which they remain at rest in a torpid state. In the spring they bore through the soft wood, more or less deeply into the trunk, the general course of their winding and irregular passages

being in an upward direction from their place of entrance. For a time they cast their chips out of their holes as fast as they are made, but after a while the passage becomes clogged and the burrow more or less filled with the coarse and fibrous fragments or wood, to get rid of which the grubs are often obliged to open new holes through the bark. The seat of their operations is known by the oozing of the sap and the dropping of the saw dust from the holes. The bark around the part attacked begins to swell, and in a few years the trunks and limbs will become disfigured and weakened by large porous tumors, caused by the efforts of the trees to repair the injuries they have suffered. . . . The grubs attain their full size by the 20th of July, soon become pupæ, and are changed into beetles and leave the trees early in September. Thus the existence of the species is limited to one year."

Space will not permit me to speak of the other members of this interesting and beautiful family—*nobilis*, *luscus*, *campestris*, *undulatus*, *longipes*, &c., each one of which is well worthy of a full description and biography.

DESCRIPTIONS OF NOCTUIDÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Before describing Noctuidæ the structure of the front or clypeus, between the compound eyes, must be examined. In a few genera it has a projection, or again a cup-like depression. The presence of ocelli, behind the antennæ, must be ascertained, and the compound eyes must be viewed under the microscope to see if the surface is naked or hairy. The tibiæ must be examined to see if they are spinose or unarmed, and the armature of the front pair, which is subject to considerable variation, must be studied carefully. After that the shape of the collar, the tuftings of the body, the neuration of the wings, the peculiarities of the antennæ and palpi, and the form of the genitalia should pass under inspection. Structural points given in descriptions will make it easier to place the species, and since our American genera are not yet in many cases fully understood, such additions to a description of the ornamentation are quite necessary.

Agrotis hilaris, n. s.

♂. Concolorous silky blackish gray with a sprinkling of paler scales. Antennae rather lengthily bipectinate. Head, collar and thorax concolorous, collar a little darker tipped; palpi darker at the sides. Only the two median lines visible; these are even, pale, the inner line oblique, the outer somewhat bent, nearly straight, not inflected. A black spot on the cell against the inner line, and a second, quadrate, larger, at the middle. These black spots follow and precede the orbicular, which, with the reniform, is concolorous with the wing and difficult to make out. The orbicular is v-shaped, open above; the reniform small, upright, medially constricted; both spots indistinctly pale-ringed. A small black spot on the line indicates the claviform. Median lines slightly marked with black on costa. Fringes concolorous. Hind wings blackish, paler at base; fringes pale, interlined. Beneath both wings blackish, with pale irroration; a common extra mesial shade line. *Expanse* 34 mil. Texas, Mr. Boll.

Resembles in color and markings *collaris*, but the collar is concolorous, antennae pectinate, the species is stouter. By the pectinate antennae allied to *badinodis*; the primaries are narrower, the color is different, the lines are pale and the inner more oblique, the collar is not distinctly dark above. The species has a slightly hoary aspect from the admixture of pale scales.

Agrotis stelaris, n. s.

♀. Varies in color from blackish to reddish purple nearly as bright as *phyllophora*. Collar yellowish white, discolorous with head and thorax. Palpi with pale third article. Reniform kidney-shaped, yellowish white, discolorous. Orbicular rounded, somewhat irregular and slightly oblique, nearly concolorous with the wing, a little shaded with yellowish; both spots annulate with dark. Lines single, blackish; half-line indicated; t. a. line waved; t. p. line lunulate, followed by a pale shade against which the darker veins and faint cloudy pointlets of the line contrast; s. t. line inaugurated by a diffuse shade on costa, below which the line is exerted and followed by pale points. Hind wings pale, soiled or fuscous-shaded, with terminal line. Beneath with discal marks and common line. *Expanse* 34 mil. *Hab.* Wash. T. (darker specimens, Mr. E. L. Graef); Nevada (reddish specimens, Mr. Neumogen).

Agrotis citricolor, n. s.

♂ ♀. All the tibiae spinose; eyes naked; ♂ antennae brush-like. Thorax and fore wings light lemon yellow; a shaded blackish mark in the place of the reniform. Terminal space and fringes brownish. Lines obsolete. Hind wings and abdomen white. *Exp.* 34 mil. *Hab.* Colorado.

This species is so simply marked and colored that the description is necessarily brief, while the insect is none the less readily recognizable.

Agrotis innotabilis Grote, Proc. Ac. N. S. Phil., 202, 1874.

This species may be known by the yellow brown reniform contrasting with the concolorous blackish orbicular. The collar is black above, gray below. Specimens from Washington Territory differ from my type from California by the median space being shaded with brown, the claviform outlined, and several fine black lines cross from the two median lines over the median space inferiorly. The species is allied to *bicarnea*. The orbicular is more or less evidently quadrate and oblique.

Polia aedon, n. s.

Eyes naked. Tibiae unarmed. Whitish gray. All the lines well written, single, black, acutely dentate. Orbicular elongate on the cell, complete, rather small. Claviform long; reniform incompletely limited exteriorly, rather wide, moderate. Median shade nearly continuous, dentate, shading into ochrey, and the reniform is slightly ochrey. Sub-terminal line irregular, strongly dentate, the teeth strongly shaded with black. T. p. line continuous, dentate, rather fainter than the other lines. A dotted terminal line; fringes dotted. The whole insect is rather dark gray; the thoracic disc with a yellowish tuft behind the collar; faint lines on the tegulae; a black line across the face; palpi entirely gray. Hind wings pale with a mesial line accented on the veins. Beneath pale, the line appears dotted and there are discal marks on both wings. *Exp.* 40 mil. *Hab.* Nevada, Mr. Neumoegen; I have seen a second specimen in Mr. Graef's collection.

Tarache sutrix, n. s.

Allied to *aprica* and between *aprica* and *tenuicula*. Yellowish or ochrey white. Inner line pale ochrey. A black point for the orbicular. Median shade rather thick, black, below and within the dot or the faint ringlet, which represents the reniform; above marked in pale ochrey to

costa. Outer line indistinct, ochrey, irregular. S. t. space shaded with plumbeous. S. t. line denticulate, followed by the pale ground color, marked with brown on costa. Terminal space irregularly shaded with plumbeous. Terminal line consisting of a series of minute black dots preceded by white points. Fringes brown or plumbeous, interrupted by a pale patch below the middle and touched with pale at apices. Hind wings pale smoky, with whitish faintly interlined fringes. Thorax ochrey white. Head ochrey white; palpi black tipped. Beneath hind wings without markings; fore wings shaded with blackish, leaving costa pale. *Expanse* 22 mil. *Hab.* Colorado; two specimens nearly alike.

I have recently examined the species of the following naked-eyed genera in my collection, and arranged them as follows:

ORTHOSIA *Ochs.*

- purpurea* Grote. California.
- crispa* Harvey. California.
- bicolorago* Guen. Can. East; Middle and West. States.
- var. ferrugineoides* Guen.
- var. bicolorago* Guen.
- spurcata* Walk.
- ralla* G. & R. Middle States.
- helva* Grote. Eastern and Middle States.
- euroa* G. & R. Can.; Western and Middle States.
- aurantiago* Guen. Middle and West. States.
- illiterata* Grote.
- differta* Morr.
- illinoisensis* French.
- disticha* Grote. South. and Western States.
- Caradrina disticha* Morr.?
- posticata* Harvey. Texas; Calif.
- lutosa* Andrews. Eastern and Middle States.
- Conradi* Grote. Western States.

GLAEA Hubn. Steph.

§ *Homoglaea* Morr.

- hircina* Morr. Can.; Illinois.
- carnosa* Grote. N. Y.; Mass.; R. I.
- § *Orrhodia* Hubn.
- viatica* Grote. Middle and So. States.

inulta Grote. Western and Middle States.

olivata Harvey. California.

anchocelioides Guen. Illinois ; Texas.

signata French.

§ *Epiglaea Grote.*

pastillicans Morr. N. Y. ; So. N. England.

tremula Harvey. TEXAS.

sericea Morr. N. Y. ; So. N. England.

venustula Grote.

apiata Grote. N. Y. ; So. N. England.

decliva Grote. Ill. ; N. Y. ; N. England.

var. *deleta Grote.*

JODIA Hubn.

rufago Hubn. Tex. ; Kansas.

CIRROEDIA Guen.

pampina Guen. N. E. Can. ; Calif. ; N. Y. ; West. States.

SCOLIOPTERYX Germ.

libatrix Linn. H. Bay Terr. to Va. Also European.

XANTHIA Hubn.

silago Esper. N. Y. Also European.

SCOPELOSOMA Curtis.

Pettiti Grote. Can. ; Illinois.

Graefiana Grote. Can. ; N. Y. ; N. J.

ceromatica Grote. Can. ; N. Y. ; N. J.

devia Grote. Ill. ; N. Y. ; Mass.

Morrisoni Grote. Ill. ; Mass.

sidus Guen. Middle and Eastern States ; Can.

var. *vinulenta Gr.*

var. *Walkeri Gr.*

tristigmata Grote. N.-Y. ; Illinois.

LITHOLOMIA Grote.

napaea Morr. Can. ; Eastern States.

LITHOPHANE Hubn.

disposita Morr. Middle and Eastern States.

hemina Grote. N. Y.

- petulca Grote.* Can. ; Middle States.
ferrealis Grote. Can. ; Middle States.
signosa Walk. N. Y. ; Middle States.
Bethunei G. & R. Can. ; Middle and Eastern States.
oriunda Grote. Canada ; Wisc.
semiusta Grote. Illinois ; Canada.
carbonaria Harvey. Calif. ; (coll. Hy. Edw.)
oregonensis Harvey. Oregon (coll. Hy. Edw.)
fagina Morr. Eastern and Middle States.
Georgii Grote. Can. ; N. Y.
antennata Walk. Can. ; Eastern, Middle and Western States.
cinerea Riley.
laticinerea Grote. Can. ; Eastern and Middle States.
cinerosa Grote. N. Y. ; praec. var. ?
unimoda Lintner. N. Y. ; praec. var. ?
tepida Grote. Can. ; N. Y. ; Mass.
Baileyi Grote. Can. ; N. Y. ; Mass.
viridipallens Grote. Mass.
querquera Grote. Mo. ; N. Y. ; Mass.
pexata Grote. Can. ; Eastern and Middle States.
lepida Lintner. Maine ; N. Y.
Thaxteri Grote. Eastern and Middle States.
capax G. & R. Eastern and Middle States.

CALOCAMPA Steph.

- nupera Lintner.* Eastern and Middle States.
cineritia Grote. Eastern and Middle States ; Oregon.
curvinacula Morr. Eastern and Middle States.

LITHOMIA Hubn.

- germana Morr.* Eastern and Middle States.

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY
OF ONTARIO.

The annual meeting of the above Society will be held in the City Hall, Hamilton, on the evening of Tuesday, the 28th of September, at 7:30 p. m. We trust that as many of our members as can possibly be present, will make it their business to attend.

A NEW SILK-SPINNING CHALCID.

BY L. O. HOWARD, WASHINGTON.

During the summer of 1879, while working with Professor Comstock upon the natural enemies of the cotton worm, I came across the following passage in his field notes of the previous year :—

"August 27.—I found yesterday a cotton worm about five-eighths of an inch in length, which, though yet alive, was being destroyed by three green larvæ which were upon it. I found the specimens about 10 a. m. Last evening I observed that the cotton worm was nearly eaten. The parasites had very short bodies, which, when they moved, were pointed at one end. I had intended to describe the specimens, but I find that they have spun cocoons about their bodies.

"August 28.—I found crawling over the ground a small cotton worm, infested by five parasites, evidently of the same species as those mentioned in my note of August 27.

"August 29.—The small green parasites which I found yesterday, destroyed the cotton worm, and, excepting two specimens which I put in alcohol, began to spin cocoons during the night."

Upon looking the specimens up, I found that two adults had issued. Owing to a lack of time the insect was not worked up for the Cotton Insect Report, and only recently have I had time to study it.

Instances in which Chalcid larvæ have been observed to spin perfect cocoons are rare. One of the most marked instances upon record is the case of the European *Euplectrus albiventris*, which was first shown to have this habit by Nees at Esenbeck (Hym. Ochn. Aff. Monogr. II. h 136). Westwood also states (Intr. II 163) that, in drawings of Chalcididae by Fonscolombe, the larva of this same species was represented as feeding externally upon a large caterpillar, and that in his description he, too, noted its cocoon spinning habit.

Now it is quite interesting to find that our cotton worm parasite is also a *Euplectrus*, some thirty years having elapsed before M. de Fonscolombe's observations have been verified. As explanatory of the fact that M. de Fonscolombe and Professor Comstock both observed these larvæ feeding externally upon their hosts, it may be urged that this external feeding was simply temporary and preparatory to spinning the cocoon, the larvæ having only recently emerged; yet, from M. de Fonscolombe's wording, "sic

cum eruca crescit, eam paulatim consumens,"—implying continued observation, and also from the fact that Prof. Comstock found his larvæ upon *half-grown* cotton worms, the opposite view can be readily held. The species, I think, may appropriately be dedicated to Prof. Comstock.

EUPLECTRUS COMSTOCKII, n. sp.

Male.—Length of body, 1.8 mm.; expanse of wing, 4 mm.; antennal scape, slender; joint 2, small; remaining five joints larger, ovate, subequal. Head smooth; scutum with many shallow, transversely elongate punctuations; scutellum and remainder of thorax smooth; abdomen smooth and shining. Scutum, with a very delicate longitudinal carina, extending back into the scuto-scutellar furrow, and forward to the prothorax. Middle tibial spur delicate, but as long as the first and second tarsal joints together. Color, black; upper surface of abdomen with an ochreous patch of varying size; antennæ and all legs ochreous; eyes dark red; wing veins fuscous.*

Described from 2 ♂ specimens.

OTTAWA FIELD NATURALISTS' CLUB.

TRANSACTIONS NO. I.

The records of the first year's efforts of this active and enterprising organization fill a goodly octavo pamphlet of sixty-two pages, which is adorned with two excellent plates. From the annual report of the Council, contained therein, we learn that the Club has a membership of over eighty, and that five excursions, for the purpose of collecting objects of natural history, have taken place during the year, with an average attendance of thirty. During the winter months a successful series of soirees were held, seven in number, at each of which interesting papers were read by members, and the specimens collected on the excursions exhibited. Many of the papers are published in the transactions; also a list of plants collected in the Ottawa district by the energetic Vice-president, Mr. Jas. Fletcher.

In the successful maintenance of this Natural History Club, Ottawa has set a noble example, which we trust will be speedily followed by similar organizations in other cities of our Province.

* In the figure of this insect, p. 196 of the report on Cotton Insect, the tarsi should be 4-jointed instead of 5, and the parts of the mesothorax should be entirely revised.

APPOINTMENT OF STATE ENTOMOLOGIST FOR NEW YORK.

We learn with much pleasure that our esteemed friend and valued contributor, Mr. J. A. Lintner, of Albany, N. Y., has received the appointment of State Entomologist. A better qualified man for the position could not, we believe, be found. Mr. Lintner has for the past thirty years devoted a large portion of his time to the study of Entomology, and paid especial attention to that practical department of the science which treats of insects injurious to agriculture. The enormous loss occasioned yearly by destructive insects, is now well known, and every means discovered to prevent or lessen these ravages, results in a large yearly gain to the cultivators of the soil. The special business of the State Entomologist will be to endeavor to ascertain how this desirable end can best be accomplished. We anticipate good results from this judicious appointment.

CORRESPONDENCE.

CAPTURE OF A BI-FORMED LYCÆNA.

DEAR SIR,—

On the 6th of June, 1880, I took a bi-formed example of *Lycæna neglecta*, one side of which had the coloration of the male, the other of the female. It was a male, as appeared on exposing the genital organs.

W. H. EDWARDS.

Coalburgh, Ma., June 18, 1880.

DEAR SIR,—

Referring to some correspondence in the ENTOMOLOGIST for 1878, page 60, I beg to inform you that during the first week in July I found *Melitæa phæton* in considerable quantities in a small clearing in Dow's-swamp, about one mile south of this city. The swamp is densely wooded with Tamarack and a thick undergrowth of *Myrica gale*, *Salices*, *Alnus incana*, &c., besides many herbaceous plants, and among them (but not at all plentiful) *Chelone glabra*. Upon enquiry, I find that this clearing was the exact locality where the late Mr. B. Billings found this Butterfly in 1870.

J. FLETCHER, Ottawa.

